

REMARKS

This Amendment responds to the non-final Office Action mailed June 29, 2007. Claims 1-17 are pending. Claims 1, 12, 15 and 17 have been amended. In view of the foregoing amendments, as well as the following remarks, Applicants respectfully submit that this application is in complete condition for allowance and request reconsideration of the application in this regard.

Rejection of Claims Under 35 U.S.C. § 102

Claims 1-3, 5, and 8-10 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,891,350 to Shan et al. (hereinafter *Shan*). Of these claims, claim 1 is the only independent claim. The Examiner contends that *Shan* shows or teaches all the elements of the rejected claims. Applicants respectfully disagree with the Examiner's contention for the reasons set forth below.

Shan fails to disclose or suggest "said second electrode movable relative to said first electrode between a first position to define a processing region for the substrate between said first electrode and said second electrode and a second position for transferring the substrate to and from said processing region" and "a tubular separating member configured for forming a vacuum-tight seal between said first electrode and said second electrode when said second electrode is moved to said first position," as set forth in Applicants' amended independent claim 1. In contrast, the lid (24) and cathode electrode (30) identified as electrodes (24, 30) by the Examiner in *Shan* are not movable relative to each other to "a first position for transferring the substrate to and from said processing region." Instead, the lid (24) and cathode electrode (30) in *Shan* have a fixed relationship. *Shan* discloses that the lid (24) is removable for the purpose of removing the anode shield (10). However, *Shan* fails to disclose that the lid is removable for the purpose of transferring substrates to and from the processing region between electrodes (24, 30). *Shan* discloses that substrates are transferred to the processing space between the electrodes (24, 30) through a slit (26) in sidewall (20) and a matching aperture (23) in the anode shield (10). *See* col. 3, lines 55-58.

In order for a reference to anticipate the invention in a claim, the reference must teach each and every element in the precise arrangement set forth in the claim. If the reference fails to teach even one of the claimed elements, the reference does not and cannot anticipate the claimed

invention. Because of the deficiencies discussed above, *Shan* fails to anticipate independent claim 1. For at least this reason, Applicants respectfully request that this rejection be withdrawn.

Shan fails to contain a suggestion to modify the processing apparatus to transfer substrates when the lid (24) is removed. As mentioned above, substrates are transferred to the processing space between the electrodes (24, 30) through a slit (26) in sidewall (20) and a matching aperture (23) in the anode shield (10). *See* col. 3, lines 55-58.

Because claims 2, 3, 5, and 8-10 depend from independent claim 1, Applicants submit that these claims are also patentable for at least the same reasons discussed above. Furthermore, these claims recite unique combinations of elements not taught, disclosed or suggested by *Shan*.

Rejection of Claims Under 35 U.S.C. § 103

Claims 15-17 over *Shan* in view of *Suntola* and *Mahe*

Claims 15-17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over *Shan* in view of U.S. Patent No. 5,711,811 to Suntola et al. (hereinafter *Suntola*) and U.S. Patent No. 4,381,965 to Mahe, Jr., et al. (hereinafter *Mahe*). Of these claims, claim 15 is the sole independent claim. Applicants respectfully disagree with the rejection for the reasons set forth in the following remarks.

As a threshold matter, the Examiner has failed to present a *prima facie* case of obviousness in the Office Action.

Specifically, the Examiner contends on page 8 of the Office Action that *Suntola* teaches “said first separating ring (32; Figure 3; column 11, lines 23-27) electrically isolating a first chamber (38; Figure 3) from a second chamber (38; Figure 3)” and “said second separating ring (32; Figure 3; column 11, lines 23-27) electrically isolating a third chamber (38; Figure 3) from a second chamber (38; Figure 3).” Applicants note that, in contrast to the Examiner’s contention, *Suntola* fails to teach that the planar elements (32) provide any type of electrical isolation whatsoever nor does *Suntola* disclose that the planar elements (32) are made of an insulating material capable of providing electrical isolation. In particular, *Suntola* fails to disclose that the reaction chamber pack (21) includes any type of electrification that would even require electrical isolation.

Moreover, in the passage spanning pages 8 and 9 of the Office Action, the Examiner identifies first, second and third “chambers” in *Suntola* as objects of Figure 3 labeled with

reference numeral (38). Yet, in this very same passage, the Examiner identifies first and second “processing regions” in *Suntola* as objects of Figure 3 labeled with reference numeral (38). This identification appears to inconsistent. Fundamentally, Applicants fail to understand how an item labeled with a single reference numeral in *Suntola* can serve as a physical object that requires electrical isolation and can also serve as an open volume between adjacent physical objects that is evacuable.

Suntola describes that the object labeled with reference numeral (38) is a reaction chamber and the object labeled with reference numeral (32) is a planar element. Applicants direct the Examiner’s attention to column 9, lines 51-55 of *Suntola* in which planar elements (10) and substrates (12) are described as forming walls between adjacent reaction chambers (13). *Suntola* further describes that the substrates (12) are placed into the reaction chambers (13). See column 9, lines 17-20. A person having ordinary skill in the art would interpret the disclosure in *Suntola* to mean that the reaction chambers (13) are open volumes in which the reactants flow. See column 10, lines 14-17. *Suntola* fails to provide an identical discussion for the embodiment in Figure 3, but states that “[t]he embodiment shown in FIG. 3 is used in the same fashion as that illustrated in FIG. 1.” *Suntola* then describes the differences between the embodiments relating to the flow ducts (22, 23) and channels (28, 29). See column 11, lines 39-66. *Suntola* uses the terms “planar element” and “reaction chamber” consistently in describing the different embodiments in Figs 1 and 3. Similar to planar elements (10) and reaction chambers (13), planar elements (32) must define the reaction chambers (38) in conjunction with the substrates (37). Hence, for this additional reason, the planar elements (32) fail to provide any type of electrical isolation whatsoever because the reaction chambers (38) are simply open volumes for reactant flow, not electrified physical objects that would require any sort of electrical isolation.

Moreover, in describing the disclosure in *Suntola*, the Examiner fails to refer to any object in *Suntola* as an electrode. MPEP § 706.02(j) requires the Examiner to state the **difference or differences** in the claim over the applied reference(s) and the **proposed modification** of the applied reference(s) necessary to arrive at the **claimed subject matter**. Hence, Applicants fail to understand the difference between *Shan* and claim 15 that required the use of *Suntola* as a secondary reference, nor the proposed modification of *Suntola* to arrive at the subject matter of claim 15.

The same deficiency is true of the Examiner's discussion of Maher on page 9 of the Office Action in which the Examiner states, "Maher teaches a wafer plasma processing apparatus (Figure 4) including plural parallel electrodes 19a,b-25a,b each interposed between insulating dielectric layers 19c-25c." Hence, Applicants fail to understand the difference between *Shan* and claim 15 that required the use of *Maher* as a secondary reference, nor the proposed modification of *Shan* and *Suntola* to arrive at the subject matter of claim 15.

The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor has done. See MPEP § 706.02(j). Applicants request that the rejection be withdrawn because the Examiner has failed to present a *prima facie* case of obviousness in the Office Action that would require rebuttal by the Applicants.

Assuming *arguendo* that the Examiner has presented a *prima facie* case of obviousness, which he has not, Applicants submit that there is no suggestion or motivation to modify *Shan* based upon the disclosure in *Suntola* to process multiple substrates, as contended by the Examiner. Specifically, *Suntola* is directed to a system for depositing thin films by vapor phase deposition in a non-plasma atomic layer epitaxy (ALE) process. To process multiple substrates, *Suntola* stacks the substrates in multiple chambers (38) defined by a stack of planar elements (32). However, *Suntola* fails to disclose how the stacked planar elements (32) could somehow be modified to permit the processing of multiple substrates in the plasma deposition system of *Shan*. For example, *Suntola* fails to disclose or suggest how a person having ordinary skill in the art would couple the planar elements (32) in *Suntola* with a power supply, such as power supply (60) in *Shan*, in order to generate a plasma inside the chambers (38). As another example, *Suntola* fails to disclose or suggest any type of electrical isolation between the planar elements (32) or how a person having ordinary skill in the art would modify the stack of planar elements (32) to include electrical isolation required for use in the plasma processing system of *Shan*.

Accordingly, a person having ordinary skill in the art would not have been motivated to modify *Shan* in the manner suggested by the Examiner based upon the disclosure in *Suntola*. For at least this reason, Applicants submit that the Examiner has failed to establish *prima facie* obviousness. Therefore, Applicants request that the rejection of independent claim 15 be withdrawn.

Moreover, the proposed modification would have rendered the plasma-processing apparatus of *Shan* unsuitable for its intended purpose and would also have changed the principle

of operation of *Shan*, which are prohibited under MPEP § 2143.01. Specifically, the proposed modification would eliminate the electrodes (24, 30) coupled with power supply (60) in *Shan* and, in their place, would substitute a stack of planar elements (32) coupled with a precursor source, as taught by *Suntola*. The planar elements (32) in *Suntola* are not electrically isolated, are not capable of being coupled with a power supply to generate a plasma in chambers (38), and are not used to perform a plasma process. Hence, the principle of operation would change from a plasma deposition process to a non-plasma deposition process. The proposed modification to *Shan* would have rendered the plasma processing system unsuitable for its intended purpose by converting it to a non-plasma processing system. For at least these additional reasons, Applicants submit that the Examiner has failed to establish *prima facie* obviousness. Therefore, Applicants request that the rejection of independent claim 15 be withdrawn.

Applicants further submit that there would have been no suggestion or motivation to modify the combination *Shan* and *Suntola* based upon the disclosure in the secondary reference *Maher*. Specifically, *Maher* teaches that if multiple electrodes are present for processing multiple substrates, then those electrodes must be situated inside “a known bell-jar type of vacuum chamber (not shown).” See column 4, lines 7-10. Hence, a person having ordinary skill in the art would be motivated to modify *Shan* such that the electrodes (24, 32) are themselves placed inside of another vacuum chamber. Furthermore, *Maher* teaches that if multiple electrodes (19-25) are present for processing multiple substrates, then adjacent electrodes are supported by uprights (34-37). See column 5, lines 42-47. Although formed from a dielectric material, these uprights (34-37) do not form a vacuum-tight seal with the electrodes (19-25) as the Examiner alleges that item 76 does in *Shan*. Hence, a person having ordinary skill in the art would be motivated to modify *Shan* to eliminate the vacuum-tight seal that item (10) allegedly provides with the electrodes (24, 30) so that multiple electrodes can be supported on stilt-like uprights inside a vacuum chamber. As a result, the electrodes (24, 30) in *Shan* would no longer form part of the vacuum vessel. To reiterate, the type of electrode arrangement disclosed in *Maher* is amenable to electrodes placed inside of a bell jar as taught by *Maher*, but not to an electrode arrangement in which at least the electrodes form part of the vacuum vessel, as disclosed in *Shan*.

A person having ordinary skill in the art would not have modified the combined disclosures of *Shan* and *Suntola* in this manner. For at least these reasons, Applicants submit

that the Examiner has failed to establish *prima facie* obviousness. Therefore, Applicants request that the Examiner withdraw the rejection of independent claim 15.

Moreover, the proposed modification would have rendered the plasma deposition system of *Shan* unsuitable for its intended purpose and would have changed its principle of operation, which are not permitted under MPEP § 2143.01. As modified by the teachings of *Maher*, the electrodes (24, 30) in *Shan* would have been placed inside of a vacuum chamber and would have been supported on uprights inside the vacuum chamber, which would defeat the intended purpose of having the electrodes (24, 30) function as part of the vacuum vessel and eliminate the necessity for the separating ring (76) in *Shan*. The proposed modification to the combination of *Shan* and *Suntola* would also convert the plasma deposition system in *Shan* to a plasma etching system, as taught by *Maher*. Plasma deposition and etching systems have very different principles of operation. For at least this additional reason, Applicants submit that the Examiner has failed to establish *prima facie* obviousness. Therefore, Applicants request that the rejection of independent claim 15 be withdrawn.

Applicants also disagree with the Examiner's motivations to combine *Maher* with *Suntola* and *Shan*. The Examiner states in the text on page 9 of the Office action that "[m]otivation to add Suntola's apparatus (Figure 3) with Maher's plasma generating means to Shan's apparatus includes, among plural motivations, for plasma processing as taught in Suntola (column 1; lines 42-44), and for processing plural substrates for greater through-put compared to Shan as taught by Suntola." Applicants fail to understand how adding "Suntola's apparatus ... with Maher's plasma generating means," to *Shan* is somehow motivated by "plasma processing as taught by Suntola" or motivated by "processing plural substrates for greater throughput compared to Shan as taught by Suntola", as alleged by the Examiner.

With regard to the former alleged motivation, the element or limitation of "Maher's plasma generating means" is not claimed subject matter set forth in independent claim 15. Consequently, the Examiner is setting forth a motivation to modify *Shan* to include a feature, namely "Maher's plasma generating means," that is not claimed subject matter set forth in independent claim 15. Furthermore, the element or limitation of "Suntola's apparatus" is not claimed subject matter in independent claim 15. Consequently, the Examiner is setting forth an improper motivation to modify *Shan* to include features, namely "Maher's plasma generating

means” and “Suntola’s apparatus,” that are not claimed subject matter set forth in independent claim 15.

Applicants further note that the passage in *Suntola* relied upon by the Examiner at column 1, lines 42-44 pertains generally to molecular beam epitaxy (MBE) and chemical vapor deposition (CVD). However, the generalities in this passage in the Background section of *Suntola* fail to disclose with any particularity how a person having ordinary skill in the art would modify the stacked planar elements (32) in *Suntola* to permit use in the plasma processing of *Shan*. *Suntola* also fails to disclose that the stacked planar elements (32) are even heated.

For at least this additional reason, Applicants submit that the Examiner has failed to establish *prima facie* obviousness. Therefore, Applicants request that the Examiner withdraw the rejection of independent claim 15.

Because claims 16 and 17 depend from independent claim 15, Applicants submit that these claims are also patentable for at least the same reasons discussed above. Furthermore, these claims recite unique combinations of elements not disclosed or suggested by the combined disclosures of *Shan*, *Suntola* and *Maher*.

Claims 4, 6, 7, and 11-14 over Shan in view of Suntola and Maher

Claims 4, 6, 7, and 11-14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over *Shan* in view of U.S. Patent No. 6,700,089 to Hirooka (hereinafter *Hirooka*). *Hirooka* fails to remedy the deficiencies of *Shan*. Because claims 10-13, 15, and 16 depend from independent claim 1, Applicants submit that these claims are also patentable for at least the same reasons as independent claim 1. Furthermore, each of claims 4, 6, 7, and 11-14 recites a unique combination of elements not disclosed or suggested by *Shan* in view of *Hirooka*.

CONCLUSION

Applicants have made a bona fide effort to respond to each and every requirement set forth in the Office Action. In view of the foregoing amendments and remarks, this application is submitted to be in complete condition for allowance and, accordingly, a timely notice of allowance to this effect is earnestly solicited. In the event that any issues remain outstanding, the Examiner is invited to contact the undersigned to expedite issuance of this application.

Applicants do not believe any fees are due in connection with filing this communication. However, if such petition is due or any fees are necessary, the Commissioner may consider this to be a request for such and is hereby authorized to charge any under-payment or fees associated with this communication, or to credit any over-payment, to Deposit Account No. 23-3000.

Respectfully submitted,
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